



FIG. 8.4 SEM images of borate (13-93B3), bioactive glass scaffolds (A, C, E), and copper-doped borate scaffolds (B, D, F) with three different microstructures: (A, B) trabecular; (C, D) oriented, with the pores oriented in the radial direction (in the plane of the image); (E, F) fibrous. (Bi, L., Rahaman, M.N., Day, D.E., Brown, Z., Samujh, C., Liu, X., et al., 2013. Effect of bioactive borate glass microstructure on bone regeneration, angiogenesis, and hydroxyapatite conversion in a rat calvarial defect model. *Acta Biomater.* 9, 8015–8026).

better capacity to stimulate bone formation in rabbit femoral condyle defects at 12 weeks postimplantation, when compared to the calcium sulfate cement (Fig. 8.5) (Cui et al., 2017).

8.3 METAL-DOPED GLASSES

In recent years, bioactive glasses are modified with a variety of trace essential or nonessential metal ions. The ions released from a bioactive glass can have vital roles in the formation, growth, and repair of the bone, wound, and nerve healing. Essential metals have been found to play vital roles in the formation,